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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,795	11/20/2002	Robert W. Zehner	H-326	6559

26245 7590 08/19/2004

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EXAMINER	
KOVALICK, VINCENT E	

ART UNIT	PAPER NUMBER
2673	

DATE MAILED: 08/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/065,795	ZEHNER ET AL.	
	Examiner	Art Unit	
	Vincent E Kovalick	2673	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 November 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *27,29 and 30* is/are allowed.

6)☒ Claim(s) *1,4,10,12-14,23-26 and 28* is/are rejected.

7)☒ Claim(s) *2,3,5-9,11 and 15-22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *5 - 8/14/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to Applicant's Patent Application, Serial No. 10/065,795, with a File Date of November 20, 2002.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 10, 13-14, 23 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. (USP 5,604,616, taken with Tone (USP 6,462,837) in view of Ng et al. (USP 5,586,05).

Relative to claim 1, Dunn et al. **teaches** a dual function electro-optical display device exhibiting a bistable image (col. 1, lines 12-62); Dunn et al. further **teaches** driving a bistable electro-optic display having a plurality of pixels, each of which is capable of displaying at least three gray levels (col. 2, lines 48-49; col. 4, lines 50-54 and Abstract).

Dunn et al. **does not teach** storing a look-up table containing data representing the impulses necessary to convert an initial gray level to a final gray level; storing data representing at least an initial state of each pixel of the display; receiving an input signal representing a desired final state of at least one pixel of the display; and generating an output signal representing the impulse necessary to convert the initial state of said one pixel to the desired final state thereof, as

determined from said look-up table.

Dunn et al teaches a dual function electro-optical display device exhibiting a bistable image.

Tone **teaches** a gay-scale conversion system (col. 2, lines 6-67 and col. 3, lines 1-38); Tone further **teaches** storing a look-up table containing data representing the impulses necessary to convert an initial gray level to a final gray level; storing data representing at least an initial state of each pixel of the display; receiving an input signal representing a desired final state of at least one pixel of the display (col. 1, lines 26-32).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide to the device as taught by Dunn et al. the feature as taught by Tone in order to provide the means to facilitate gray-scale conversion such as gamma correction.

Dunn et al. taken with Tone **does not teach** generating an output signal representing the impulse necessary to convert the initial state of said one pixel to the desired final state thereof, as determined from said look-up table.

Dunn et al. taken with Tone teaches a dual function electro-optical display device exhibiting a bistable image comprising the means to do gray-scale conversion.

Ng. et al. **teaches** a memory having data representing correction factors stored therein for the correction of non-uniformity of light emissions from light emission elements (col. 2, lines 26-50); Ng et al. further **teaches** generating an output signal representing the impulse necessary to convert the initial state of said one pixel to the desired final state thereof, as determined from said look-up table (col. 10, lines 56-61).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide to the device as taught by Dunn et al. taken with Tone the feature as taught by Ng et

al. in order to provide the means to facilitate gray-scale conversion such as gamma correction using pixel illumination state data extracted from a look-up table

Regarding claims 10 and 23, Dunn et al. taken with Tone in view of Ng. et al. **does not teach** the method step wherein an output signal represents the period of time for which a substantially constant drive voltage is to be applied to a pixel; said step being in common practice in the generation of output signals directed at display device

pixels.

Because said step is in common practice and well know in the art, it would have been obvious to a person of ordinary skill in the art at the time of the invention to provide said step in the device as taught by Dunn et al. taken with Tone in view of Ng. et al. in order to assure the duration of the voltage signal driving a pixel.

Regarding claim 13, Ng. et al. further **teaches** said electro-optic display output signal representing the period of time for which a substantially constant drive voltage is to be applied to a pixel (col. 10, lines 50-54).

Relative to claim 14, Ng. et al. further **teaches** output means for generating an output signal representative of said impulse (col., 10, lines 56-61).

Regading claim 25, Ng. et al. further **teaches** generating an output signal representing the impulse necessary to convert the initial state of said one pixel to the desired final state thereof, as determined from said look-up table, the output signal representing the period of time for which a substantially constant drive voltage is to be applied to said pixel (col. 10, lines 56-61).

Relative to claim 26, Ng. et al. further **teaches** output means for generating an output signal representative of said impulse, said output signal representing the period of time for which a substantially constant drive voltage is to be applied to said pixel (col. 10, lines 56-61).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. taken with Tone in view of Ng. et al. as applied to claim 1 in item 3 herein above, and further in view of Iwasaki (USP 5.604,584).

Relative to claim 4, Dunn et al. taken with Tone in view of Ng. et al. **does not teach** method comprising receiving a temperature signal representing the temperature of at least one pixel of the display and generating said output signal dependent upon said temperature signal.

Dunn taken with Tone in view of Ng. et al. teaches a dual function electro-optical display device exhibiting a bistable image comprising gamma correction using pixel illumination state data extracted from a look-up table.

Iwasaki **teaches** photometry device with correction for temperature change (col. 1, lines 53-67 and col. 2, lines 1-19); Iwasaki further **teaches** a method step comprising receiving a temperature signal representing the temperature of at least one pixel of the display and generating said output signal dependent upon said temperature signal (col. 2, lines 3-9).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide to the device as taught by Dunn et al. taken with Tone in view of Ng. et al. the method step as taught by Iwasaki in order to provide mans for correcting light sensitive changes in the light receiving elements due to temperature thus generating consistent outputs for objects with the same brightness independent of temperature variations.

5. Claims 12 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunn et al. taken with Tone in view of Ng. et al. as applied to claims 1 and 14 respectively in item 3 herein above, and further in view of Wilkinson (USP 3,657,653).

Regarding claim 12, Dunn et al. taken with Tone in view of Ng. et al. **does not teach** a method step according to claim 1 wherein said output signal comprises at least one polarity bit representing the polarity of the impulse necessary to convert the initial state of said one pixel to the desired final state thereof.

Dunn et al. taken with Tone in view of Ng. et al. teaches a dual function electro-optical display device exhibiting a bistable image comprising means to facilitate gray-scale conversion such as gamma correction using pixel illumination state data extracted from a look-up table.

Wilkinson **teaches** a pulse code modulation system (col. 1, lines 61-67; col. 2, lines 1-67 and col. 3, lines 1,65); Wilkinson further **teaches teach** a method step wherein said output signal comprises at least one polarity bit representing the polarity of the impulse necessary to convert the initial state of said one pixel to the desired final state thereof (col. 6, lines 25-36 and Abstract).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to provide to the device as taught by Dunn et al. taken with Tone in view of Ng. et al. the method step as taught by Wilkinson in order to provide a method step wherein the output signal comprises the data bit necessary to set the polarity of the pixel final state.

6. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morita (US 2002/0005722).

Relative to claim 28, Morita **teaches** a signal supply apparatus in which signals having specified voltages supplied from a signal supply source (pg. 1, paras. 0005-0013 and pg. 2, paras. 0014-0017);

Morita further **teaches** a driver circuit comprising: output lines arranged to be connected to drive electrodes of an electro-optic display; first input means for receiving plurality of (n+1) bit numbers representing the voltage and polarity of signals to be placed on the drive electrodes; and second input means for receiving a clock signal, the driver circuit being arranged such that, upon receipt of the clock signal, the driver circuit displays the selected voltages on its output lines (pg. 3, paras. 0040-0045).

The difference between the teaching of Morita and that of the instant invention is that the instant invention is directed to a driver circuit wherein Morita is directed to a system signal supply apparatus.

It would have been obvious to a person of ordinary skill in the art at the time of the invention that the limitations as taught by Morita satisfy the limitations as set forth in claim 28 of the instant invention.

Allowable Subject Matter

7. Claims 2-3, 5-9, 11 and 15-22 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Relative to claim 2, the major difference between the teachings of the prior art of record (Dunn et al. (USP 5,604,616); Tone (USP 6,462,837) and Ng et al. (USP 5,586,05)) and that of the instant invention is that said prior art of record **does not teach** a method step comprising storing data

representing at least prior state of each pixel prior to said initial state thereof, and wherein said output signal is generated dependent upon both said at least one prior state and said initial state of said one pixel

Regarding claim 5, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art of record **does not teach** a method step wherein said look-up table stores multiple values for each transition from an initial gray level to a final gray level, said multiple values representing the values required for a specific transition at a specific temperature.

Regarding claim 7, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art of record **does not teach** a method step wherein said look-up table stores functions of temperature, and wherein said output signal is generated by calculating the value of the relevant function at the temperature indicated by said temperature signal.

Regarding claim 8, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art of record **does not teach** a method step comprising generating a lifetime signal representing the operating time of said pixel and generating said output signal dependent upon said lifetime signal.

Regarding claim 9, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art of record **does not teach** a method step comprising generating a residence time signal representing the time since said pixel last underwent a transition and generating said output signal dependent upon said residence time signal.

Regarding claim 11, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art of record **does not teach** a method step comprising a plurality of sub-scan periods and said output signal represents determines during which of said sub-scan periods a drive voltage is to be applied to said pixel.

Relative to claim 15, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art of record **does not teach a** controller wherein said storage means is also arranged to store data representing a least one prior state of each pixel prior to said initial state thereof, and said calculation means is arranged to determine said impulse dependent upon said input signal, said initial state of said pixel and said prior state of said pixel.

Regarding claim 17, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art of record **does not teach a** controller wherein said input means is arranged to receive a temperature signal representing the temperature of at least one pixel of the display, and said calculation means is arranged to determine said impulse dependent upon said input signal, said initial state of said pixel and said temperature signal.

Relative to claim 21, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art of record **does not teach a** controller a comprising lifetime signal generation means arranged to generate a lifetime signal representing the operating time of said pixel, said calculation means determining said impulse from said input signal, said stored data representing the initial state of said pixel and said lifetime signal.

Relative to claim 22, the major difference between the teachings of the said prior art of record

and that of the instant invention is that said prior art of record **does not teach a** controller a comprising residence time signal generation means for determining the residence time since said pixel last underwent a transition and for generating a residence time signal representing said residence time, said calculation means determining said impulse from said input signal, said stored data representing the initial state of said pixel and said residence time signal.

8. Claim 27 and 29-30 are allowed.

9. The following is an examiner's statement of reasons for allowance:

Regarding claim 27, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art of record **does not teach a** device controller comprising: storage means arranged to store both a look-up table containing data representing the impulses necessary to convert an initial gray level to a final gray level, and data representing at least an initial state of each pixel of the display; input means for receiving an input signal representing a desired final state of at least one pixel of the display; calculation means for determining, from the input signal, the stored data representing the initial state of said pixel, and the look-up table, the impulse required to change the initial state of said one pixel to the desired final state; and output means for generating an output signal representative of said impulse, the output signal representing a plurality of pulses varying in at least one of voltage and duration, the output signal representing a zero voltage after the expiration of a predetermined period of time.

Regarding claim 29, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art of record **does not teach a** driver circuit comprising: output lines arranged to be connected to drive electrodes of an electro-optic display; first input means for receiving a plurality of 2-bit numbers representing the voltage and polarity

of signals to be placed on the drive electrodes; and second input means for receiving a clock signal, the driver circuit being arranged such that, upon receipt of the clock signal, the driver circuit displays voltages selected from R+V, R and R-V on its output lines, where R is a reference voltage and V is the maximum difference from the reference voltage that the driver circuit can assert.

Regarding claim 29, the major difference between the teachings of the said prior art of record and that of the instant invention is that said prior art of record **does not teach a** method for driving an electro-optic display having a remnant voltage, the method comprising: (a) applying a first driving pulse to a pixel of the display; (b) measuring the remnant voltage of the pixel after the first driving pulse; and (c) applying a second driving pulse to the pixel following the measurement of the remnant voltage, the magnitude of the second driving pulse being controlled dependent upon the measured remnant voltage to reduce the remnant voltage of the pixel.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U. S. Patent No.	6,608,701	Loce et al.
U. S. Patent No.	5,615,016	Thakur et al,
U. S. Patent No.	5,261,010	Lo et al.

Responses

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vincent E Kovalick whose telephone number is 703 306-3020. The examiner can normally be reached on Monday-Thursday 7:30- 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on 703 305-4938. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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